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10/550,896	09/27/2006	Hisashi Miyamori	4035-0175PUS1	1709
2292 7590 05/05/2008 BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747				
EXAMINER NEWMAN, MICHAEL A				
ART UNIT		PAPER NUMBER		
2624				
NOTIFICATION DATE		DELIVERY MODE		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary

Application No.

10/550,896

Applicant(s)

MIYAMORI, HISASHI

Examiner

MICHAEL A. NEWMAN

Art Unit

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 January 2008.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-14 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 25 January 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-8508)
4) ☐ Interview Summary (PTO-413)
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____
Paper No(s)/Mail Date _____

DETAILED ACTION

Response to Amendment

1. The amendment received on January 25th, 2008 has been entered.
2. In view of the amendment to the claims the amendment to claims 1 – 12 and the addition of claims 13 and 14 are acknowledged.
3. In view of the amendments to claims 6 and 12, the previous objection has been withdrawn.
4. In view of the amendment to claims 1 and 7, the rejection under 35 U.S.C. 102 has been withdrawn.
5. In view of the amendment to claim 1 the previous rejection of claims 3, 4, and 5 under 35 U.S.C. 112 has been withdrawn; however, new issues have been raised in a new rejection under 35 U.S.C. 112.
6. In view of the amendment to claims 5 and 11, the previous indication of allowable subject matter has been withdrawn.
7. The substitute abstract has been entered.

Specification

8. The amendment filed on January 25th, 2008 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

a. As shown in paragraph 0081 of the marked-up substitute specification, the original disclosure taught a step of ANDing two *difference images* with each other as a binary image. The substitute specification now describes a step of ANDing two *different* images with each other as a binary image. Although a *different* image and a *difference image* may appear to be superficially analogous, in the art of image analysis a *difference image* is known to be result of subtracting an image from another image.

b. As shown in paragraph 0087 of the marked-up substitute specification, the original disclosure taught a step of OR'ing "the two images with each other and made to a binary image $B_{\text{and}}(t)$." After careful examination of the surrounding context, it becomes evident that 'the two images' refer to $B'_{\text{diff}}(t)$ and $B'_{\text{label}}(t)$, which are entire binary images of only the moving player objects. The substitute specification now describes OR'ing "the two image objects with each other...", such that the line-shaped image object and the moving image object are ORed. This is essentially different from the original disclosure.

Applicant is required to cancel the new matter in the reply to this Office Action.

Response to Arguments

9. Applicant's arguments, with respect to the rejections under 35 U.S.C. 102 of the independent claims 1 and 7, have been considered but are moot in view of the new ground(s) of rejection.

a. In pages 12 to 16 of the Remarks filed on January 25th, 2008, with regards to the 35 U.S.C. 102 rejection of claims 1 and 7 over Katoh et al. (U.S. Patent No. 6,654,495), "Katoh", Applicant's Representative correctly points out that Katoh teaches eliminating a lined-shaped object from character objects, while the newly-amended claims require that the lined-shaped object is removed from a *moving* object. The Examiner acknowledges this difference.

Claim Rejections - 35 USC § 112

10. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

11. Claims 5, 11, 13 and 14 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

a. Regarding claims 5 and 11, they had been previously been indicated allowable. However, in view of the amendment filed on January 25th, 2008, Applicant has changed to scope of the claims to exceed that set forth in the originally filed disclosure. The original claims recited determining the change region in the one arbitrary frame by extracting predetermined frames before and after the one frame and obtaining *difference images* between each

predetermined frame and the one frame, respectively, as well as executing an ANDing operation of both the *difference images*. The new claims recited extracting predetermined frames before and after the one frame and obtain *different* images between each predetermined frame and the one frame. Although a different image and a *difference image* may appear to be superficially analogous, in the art of image analysis that a *difference image* has a precise meaning well known to be result of subtracting an image from another image.

b. Regarding claims 13 and 14, they are directed to the new matter indicated in the discussion of the specification (paragraph 7 section b, above). It is clear that the original disclosure did not include a step of ORing the line-shaped image object and the moving image object to generate the binary image.

12. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

13. Claims 2 – 6, 8, 9 and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. Claims 2 – 6, 8, 9 and 10 all contain references "the moving image object". From the newly-amended independent claims 1 and 7, it is clear that "in one image", there is a "moving image object" and a "lined-shape image object", which undesirably overlap. Dependent claims 2 - 6, 8, 9 and 10 however, recite: for example in claim 2, "wherein the image is one frame in the moving image object

comprising a plurality of frames". Similarly, claim 3 recites "subjecting a single frame or plural frames in the moving image object comprising a plurality of frames..." Thus, in the dependent claims, it appears as though the moving image object is not actually an object within an image, but instead a set of frames containing motion or movement. It is unclear the meaning Applicant intends by the amendment to the claims. The claims therefore fail to clearly set forth the scope of the invention and are rendered indefinite.

Claim Rejections - 35 USC § 103

14. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

15. Claims 1 – 4, 6 – 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Martins (U.S. Patent No. 6,950,123) in view of Averbuch et al. (U.S. Patent No. 7,085,401). Hereinafter referred to as Martins and Averbuch, respectively.

a. Regarding claims 1, 6, 7 and 12, Martins teaches an image processing apparatus and method for eliminating a line-shaped image object (**Martins Col. 4 lines 28 – 31 – "Field Model"**), which overlaps with a moving image object in a single image comprising effective or ineffective pixels, from the moving image object (**Martins Col. 5 lines 60 – 66 – "The players"**), the apparatus comprising: a line segment extraction means for extracting a line segment from the line-shaped image object (**Martins Col. 4 lines 28 – 31 and lines 45 - 46**)
[Note that a soccer field consists of lines similar to those of the exemplary

tennis court in the disclosure]; a line-shaped image elimination means for eliminating the line-shaped image object from the moving image object (**Martin Col. 5 line 64 - Col. 6 line 3**); an image scan means for scanning a vicinity region of the line segment on the moving image object and sequentially extracting pixels to be scanned (**Martin Col. 6 lines 1 – 4**) [**Note that players are scanned and converted into blobs**]; an effective pixel determination means for determining whether or not the extracted pixels to be scanned are the effective pixels (**Martin Col. 6 lines 8 – 10**). Martin proceeds to track players by identifying the largest *connected* components in each region of interest (**Martin Col. 6 lines 58 – 60**), in order to improve accuracy; Martin suggests applying noise floor processing and morphological filtering to the difference image. However, **Martin fails to teach** a pixel interpolation means for dropping a perpendicular from the pixels to be scanned that are determined to be the effective pixels at the effective pixel determination step to a nearest line segment and setting all the pixels on the perpendicular as the effective pixels. **Pertaining to the same field of endeavor Averbuch teaches an automatic moving object extraction system in which after an initial identification of moving segments, a region-growing algorithm is applied to eliminate missing pixels (Averbuch Col. 24 lines 54 – 57). Specifically Averbuch teaches for each object, extracting edge line information using, for example, the Hough transform, and for extracted edge line belonging to an object, interpolation is performed to obtain a complete contour. However, to fill missing pixels**

of each object, Averbuch teaches choosing the lowest previously-derived real point on the object, drawing the perpendicular line of the lowest pixel until it hits another real point. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to, as suggested by Martin, carry out a morphological operation such as the region growing implementation taught by Averbuch on Martin's extracted player blobs to improve the centroid location assigned to the largest connected component and thus improve player tracking.

b. Regarding claims 2 and 8, Martin further teaches that the image is one frame in the moving image object comprising a plurality of frames (**Martin Col. 3 lines 3 – 5**).

c. Regarding claims 3, 4, 9 and 10 Martin further teaches that the image is an image obtained by subjecting a single frame or plural frames in the moving image object comprising the plurality of frames to predetermined arithmetic processing, wherein the arithmetic processing is any one of processing for determining a difference between two arbitrary frames in the moving image or processing for determining a change region in one arbitrary frame in the moving image. (**Martin Col. 5 line 64 – Col. 6 line 3**) [**Note that the difference operation is arithmetic processing**].

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. Gu et al. (U.S. Patent No. 6,711,278) teaches semantic object tracking using region segmentation enhancement methods.
- b. Sudhir, G., John C. M. Lee, and Anil K. Jain. "Automatic Classification of Tennis Video for High-level Content-based Retrieval." 1998 International Workshop on Content-Based Access of Image and Video Databases (CAIVD '98) (1998): 81-89 teaches automatic player tracking in tennis matches.
- c. Ohno, Yoshinori, Jun Miura, and Yoshiaki Shirai. "Tracking Players and a Ball in Soccer Games." International Conference on Multisensor Fusion and Integration for Intelligent Systems, IEEE Proceedings (1999): 147-152 teaches using uniform colors to detect players.
- d. Miyamori, Hisashi. "Automatic Annotation of Tennis Action for Content-Based Retrieval by Integrated Audio and Visual Information." Lecture Notes in Computer Science 2728/2003(2003): 331-341. An article by the inventor disclosing the same inventive concept.

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL A. NEWMAN whose telephone number is (571)270-3016. The examiner can normally be reached on Mon - Thurs from 9:30am to 6:30pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Samir A. Ahmed can be reached on (571) 272-7413. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2624

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

M.A.N.

/Samir A. Ahmed/
Supervisory Patent Examiner, Art Unit 2624